

THURSDAY, FEBRUARY 28, 1907.

SCHOOL MATHEMATICS.

- (1) *Trigonometry for Beginners*. By J. W. Mercer. Pp. xi+351. (Cambridge: University Press, 1906.) Price 4s.
- (2) *Trigonometry for Beginners*. By Rev. J. B. Lock and J. M. Child. Pp. vii+195. (London: Macmillan and Co., Ltd., 1906.) Price 2s. 6d.
- (3) *Geometry: an Elementary Treatise on the Theory and Practice of Euclid*. By S. O. Andrew. Revised edition. Pp. xii+218. (London: John Murray, 1906.) Price 2s.
- (4) *Modern Commercial Arithmetic*. Part i. By G. H. Douglas. Pp. 163. (London: Macmillan and Co., Ltd., 1906.) Price 1s. 6d.
- (5) *A New Shilling Arithmetic*. By C. Pendlebury, assisted by F. E. Robinson. Pp. xii+176+xxxiv. (London: George Bell and Sons, 1906.) Price, with answers, 1s. 4d.
- (6) *Junior Arithmetic Examples*. By W. G. Borchardt. Pp. viii+171+xi. (London: Rivingtons, 1906.) Price 1s. 6d.
- (7) *Clive's New Shilling Arithmetic*. Edited by Dr. W. Briggs. Pp. viii+160. (London: W. B. Clive, University Tutorial Press, Ltd., 1906.) Price 1s.
- (8) *Junior Practical Mathematics*. By W. J. Stainer. Pp. x+350. (London: George Bell and Sons, 1906.) Price 3s.
- (9) *A Rhythmic Approach to Mathematics*. By Edith L. Somervell, with a preface by Mary Everest Boole. Pp. 67. (London: George Philip and Son, Ltd., 1906.) Price 2s. 6d. net.

(1) **M**R. MERCER possesses a fine conception of how trigonometry should be presented to youths, and his book is admirable and altogether good. The development of the subject is very gradual indeed, and is constantly enforced by means of concrete examples, systematic computations, practical geometry, and by judicious graphs. Thus the first ten chapters are confined to the development of the simple trigonometrical ratios, that is, to the solution and application of right-angled triangles, under all sorts of conditions, such as in problems of elementary surveying, the resolution of vectors, areas, solutions of triangles in general, &c., and later on additional illustrations of right-angled triangles occur in the chapter on traverse tables. Four-figure mathematical tables, including logarithms, are in constant use, and careful attention is paid to arrangement and checking of the numerical work. After this thorough grounding, angles of any magnitude are introduced, and triangles are solved by general formulæ, a useful table of log. haversines being here provided. Then the radian measure of an angle is explained, and the treatment becomes more abstract, the final chapters dealing with multiple and submultiple angles, transformation formulæ, identities, equations, and inverse notation. Finally, there are two hundred miscellaneous examples grouped in sets of five, and collected answers to the very numerous exercises dis-

tributed throughout the book. The author is to be congratulated on having produced a very notable textbook on elementary trigonometry, and one that is worthy of adoption in the secondary, technical, and public schools throughout the country.

(2) Messrs. Lock and Child, like the author just noticed, start with the very laudable idea of presenting the subject in a more practical and less abstract form than is commonly met with, and they are successful, though not to the same extent as in the previous case. Their development of the subject is not so finely graduated; they have not sufficiently recognised the fundamental importance of the right-angled triangle, and their special five-figure tables, without differences, though compact, become tedious in use and necessitate undue attention being given to the theory of proportional parts, a side issue. The opening chapters of the book are geometrical, and contain descriptions of practical methods of measuring angles, both of azimuth and of elevation, a detailed description of the sextant and theodolite being reserved for a later chapter. Suitable exercises and test papers are provided at intervals, and the work concludes with answers and an index. The book contains many good features, and can be recommended especially to students preparing for the examination of the Board of Education in mathematics, stage 2.

(3) As the result of increased experience, and also to meet the requirements of examiners, the subject-matter of Mr. Andrew's well-known "Geometry" has been re-arranged and added to, while preserving the excellent features of the original work. Thus the first seven chapters are mainly experimental, practical, and quantitative, and with the "intimate first-hand knowledge" of geometry thus obtained the learner is well prepared for the theoretical work of the next chapter, in which formal proofs are given, arranged in logical sequence. The deductive method is employed in subsequent work, which deals with similar figures, the solution of triangles, solid geometry and projection, and the mensuration of geometrical solids. The plan and scope of the book are excellent, and in its revised form the manual will deservedly appeal to an increasing number of readers.

(4) The "Commercial Arithmetic" by Mr. Douglas is a very interesting work. Assuming the student to possess a knowledge of the fundamental rules of arithmetic, the author begins with examples of the tabular arrangement of numbers, with checks, labour-saving devices, and contracted and approximate methods in addition, subtraction, multiplication and division, and with the decimalisation of money. In the chapter on the calculation of prices we find some very neat methods of working. For example, since $365 = 240 + 120 + 5$, we have 365 at, say, 8d. each = $8l. + 4l. + 3s. 4d. = 12l. 3s. 4d.$ In dealing with percentages, commission, discount, and profit and loss, examples of commercial book-keeping are given, and there is the same regard for special and rapid methods of computation. In the calculation of simple interest for a specified number of years and days, an ingenious method known as the "third, tenth, tenth" is much used. The table given on p 88 for finding the

number of days between any two dates would be improved by a grouping of the rows. Subsequent chapters deal with compound interest, various kinds of discount, bills of exchange, shares, mixtures, and with examples involving general tables of weights and measures, English and French. Collected answers are given at the end, and altogether the book is very cleverly written, and seems eminently suited for use on the commercial side of the numerous technical and secondary schools of the country.

(5) This book is practically the authors' "Junior Arithmetic," with the chapters on the first four rules replaced by sets of examples for revision. It is intended for the middle and lower forms of secondary schools, and is specially adapted to the requirements of the Oxford, Cambridge, and Scotch local examinations and the like. The explanations of the rules are condensed, and the book contains a very large collection of examples, and is printed both with and without answers.

(6) The volume by Mr. Borchardt is based on the author's "Arithmetical Types and Examples," but with many additions; the explanations and statements of the rules are left entirely to the teacher, the sets of examples being well chosen and carefully grouped. The book is suitable for use under conditions similar to those stated under No. 5.

(7) Clive's "New Shilling Arithmetic" is mainly a collection of exercises and problems, with such statements and definitions of rules as a pupil might profitably commit to memory. It covers largely the same ground as the two previous books, all three having been much influenced by the recent reforms in mathematical teaching. The book can be had with answers at a small extra cost.

(8) The "Junior Practical Mathematics" is intended for use in preparatory and public elementary schools and in the lower forms of secondary schools. The book is divided into two parts, which may be obtained either separately or together, and with or without answers. Part i. is mainly arithmetical, but the numerical work is supplemented throughout by algebraical and graphical work. This part contains, amongst other things, the four simple rules, practice, brackets, areas, volumes and weights, graphs, fractions, indices, logarithms, proportion, percentages, interest, approximations, and contracted methods. Part ii., which is chiefly geometrical, includes elementary plane geometry, orthographic projection and descriptive geometry, and some mensuration. In both parts the sequence is unusual, and seems somewhat erratic. The book is well supplied with a good variety of examples and exercises.

(9) The preface to this suggestive book is written by Mrs. Boole, who is the originator of the method described in its pages, a system which well deserves the sympathetic consideration of educational reformers. The leading idea is, working on untutored minds, to find "a means of introducing little children to the conception of a connection between organic thought-sequence and the evolution of harmonious form." The means employed is simple embroidery in coloured threads; by following some simple rule

"a graceful curve such as he has perhaps never before seen or imagined, grows up under his hands, as if by miracle." One such is the curve of pursuit. The method has been successfully carried out by Mrs. Somervell and others, and has developed into a system of geometrical design which Mrs. Boole unhesitatingly believes "is a working possibility as a means of truly national evocation of creative and organising power." In order to encourage the spread of the system sets of curve-sewing apparatus have been designed, and can be procured at a moderate cost.

THE ZOOLOGIST AND SPORTSMAN IN BRITISH COLUMBIA.

Camp-fires in the Canadian Rockies. By Dr. William T. Hornaday. Pp. xvii+353; illustrated. (London: T. Werner Laurie, 1906.) Price 16s. net.

MOST sporting books leave the distasteful impression that the hunter's main interest in wild animals is that they are something to kill—the bigger the better. But this book shows us a hunter who, though ardent in the chase and glowing with its barbaric excitement and triumphs, has yet a conscience in his slaying, and can, on occasion, find as keen pleasure in stalking without intent to kill, but only to observe and picture. So that while the sporting man will find in the book a sufficient spice of hunting incident and success to stir the savage emotion, the less bloodthirsty reader also will find satisfaction in the moderation of this hunter and in his vivid presentment of the wild life of mountain and forest.

The book is the record of a recreative holiday trip made in the autumn of 1905 by Dr. Hornaday, the Director of the New York Zoological Park, under the guidance of his friend Mr. Phillips, Pennsylvania State Game Commissioner, to a hunter's paradise hidden away among the mountains of the south-eastern part of British Columbia, where, actually, on the first day of their coming, a band of mountain-goats stampeded through their very camp, almost upsetting the cook at his work!

Here, and at a later camp, with the tangled forests below them and the stony peaks above, they spent their thirty days in great content, readily securing the few picked specimens of mountain-goat and sheep for which they had come; having also the additional luck to add a grizzly bear apiece to their trophies; and thereafter enjoying splendid though somewhat hazardous sport in striving, with success, to "break record" in photographing their live game at close and still closer quarters among the precipices. Of these days in the "home of the mountain-goat" two only were given to hunting goats to shoot them.

"We saw two hundred and thirty-nine individuals. . . . It was because we shot little that we saw much."

Here is a charming picture of the kind of thing they saw:—

"Rising into view out of a little depression on the farther side of the meadow, lazily sauntering along, there came ten big, snow-white billy goats! . .